



**U.S. Department of Energy**  
**Office of River Protection**

P.O. Box 450  
Richland, Washington 99352

03-OSR-0123

Mr. R. F. Naventi, Project Manager  
Bechtel National, Inc.  
2435 Stevens Center  
Richland, Washington 99352

Dear Mr. Naventi:

CONTRACT NO. DE-AC27-01RV14136 – PARTIAL APPROVAL OF AUTHORIZATION BASIS CHANGE NOTICE (ABCN) 24590-WTP-ABCN-ESH-02-023, REVISION 0, MODIFICATION OF THE RADIOLOGICAL EXPOSURE STANDARDS (RES)

- References:
1. BNI letter from A. R. Veirup to M. K. Barrett, ORP, "Authorization Basis Change Notice 24590-WTP-ABCN-ESH-02-023, Revision 0, Modification of the Radiological Exposure Standards," CCN-038773, dated September 5, 2002.
  2. ORP letter from R. J. Schepens to R. F. Naventi, BNI, "Review Deferral of Authorization Basis Change Notice (ABCN) 24590-WTP-ABCN-ESH-02-023, Revision 0, Modification of the Radiological Exposure Standards," 02-OSR-0509, dated October 24, 2002.

This letter approves, in part, the subject ABCN submitted in Reference 1. The ABCN proposed changes to the Safety Requirements Document (SRD) Safety Criterion 2.0-1 (the RES) and to portions of the Severity Level (SL) definitions in Section 4.3.1 of Appendix A for facility workers and co-located workers. The U.S. Department of Energy, Office of River Protection (ORP) previously requested additional information in Reference 2 to support the review of the ABCN due to insufficient justification of the proposed changes. Discussions with your staff have provided part of the additional information requested.

The ABCN proposed an increase to the RES from  $\leq 25$  to  $\leq 100$  rem/event for both the facility worker and co-located worker for mitigated consequences in the extremely unlikely events probability range. The ABCN also proposed changes to the definitions of SL-1 and SL-2 unmitigated consequence categories from  $\leq 25$  to  $\leq 100$  rem/event for the facility worker and co-located worker.

Based upon evaluation of the ABCN and the additional information provided by the Contractor, the ORP approves the extremely unlikely RES change for the facility worker and the SL definition change for both the facility and co-located worker as described in the attached Safety Evaluation Report. The ORP does not approve the change BNI proposed to the co-located worker RES for extremely unlikely events.

The ORP concluded, for the approved portions of the ABCN, there is reasonable assurance the health and safety of the public, the workers, and the environment will not be adversely affected by the proposed changes to the facility worker RES and SLs, and the co-located worker SL definitions. These changes do not constitute a reduction in commitment or effectiveness relative to the conduct of operations and are approved.

As part of the amendment implementation process, please submit within 14 days of receipt of this letter, the revised pages of the SRD, identifying all revisions to date, and deleting the change in RES for co-located workers. This amendment is effective immediately and shall be fully implemented within 30 days; i.e., the provisions of the amendment that are approved may be used immediately; within 30 days, controlled copies of the SRD and subordinate documents must be modified to reflect the changes associated with this amendment.

If you have any questions, please contact me, or your staff may call Lew Miller, WTP Safety Regulation Division, (509) 376-6817.

Sincerely

Roy J. Schepens  
Manager

OSR:JLP

Attachment

**Safety Evaluation Report**  
**Authorization Basis Change Notice (ABCN) 24590-WTP-ABCN-ESH-02-023, Rev. 0**  
**Modification of the Radiological Exposure Standards (RES)**

## **1.0 INTRODUCTION**

This safety evaluation report documents the basis for the approval and rejection by the U. S. Department of Energy, Office of River Protection (ORP) of portions of ABCN 24590-WTP-ABCN-ESH-02-023, Revision 0, *Modification of the Radiological Exposure Standards*, CCN-038773, dated September 5, 2002.<sup>1</sup> The ORP previously requested additional information to support the ABCN in *Review Deferral of Authorization Basis Change Notice (ABCN) 24590-WTP-ABCN-ESH-02-023, Revision 0, Modification of the Radiological Exposure Standards*, CCN-045553, dated October 24, 2002.<sup>2</sup> The Contractor provided additional information through discussions that partially addressed the ORP concerns.

The ABCN documents the Contractor's request to change portions of the Safety Requirements Document (SRD) Safety Criterion 2.0-1 (the RES) listed, and portions of the definition for Severity Level (SL) as listed in Section 4.3.1 of Appendix A. The proposed changes to the RES are an increase from  $\leq 25$  to  $\leq 100$  rem/event for both the facility worker and co-located worker mitigated consequences in the extremely unlikely events probability range. The proposed changes to the definitions of SL-1 and SL-2 unmitigated event consequences are an increase from "> 25 rem/event" to "> 100 rem/event" and from "5-25 rem/event" to "5-100 rem/event," respectively, for both the facility worker and co-located worker.

## **2.0 BACKGROUND**

Contract No. DE-AC27-01RV14136,<sup>3</sup> Section C, Standard 7, Item d requires the Contractor to conduct work in accordance with the Contractor developed and DOE approved SRD. Section C, Standard 7, Item e(1)(i) of the Contract requires the Contractor to develop and implement a standards-based integrated safety management (ISM) program. Section C, Standard 7, Item e(2)(ii) of the Contract requires the Contractor's ISM program to comply with the regulatory program established in DOE/RL-96-0006, *Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for the RPP Waste Treatment Plant Contractor*.<sup>4</sup> Finally, Section C, Standard 7, Item e(2)(iii) of the Contract requires the Contractor's ISM Plan to conform to

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<sup>1</sup> BNI letter from A. R. Veirup to M. K. Barrett, ORP, "Authorization Basis Change Notice 24590-WTP-ABCN-ESH-02-023, Revision 0, Modification of the Radiological Exposure Standards," CCN 038773, dated September 5, 2002.

<sup>2</sup> ORP letter from R. J. Schepens to R. F. Naventi, BNI, "Review Deferral of Authorization Basis Change Notice (ABCN) 24590-WTP-ABCN-ESH-02-023, Revision 0, Modification of the Radiological Exposure Standards," 02-OSR-0509, dated October 24, 2002.

<sup>3</sup> Contract No. DE-AC27-01RV14136, between the U.S. Department of Energy and Bechtel National, Inc., dated December 11, 2000.

<sup>4</sup> DOE/RL-96-0006, *Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for the RPP Waste Treatment Plant Contractor*, Revision 2, February 2001.

RL/REG-97-13, *Regulatory Unit Position on Contractor-Initiated Changes to the Authorization Basis*.<sup>5</sup>

To manage the radiological and nuclear safety risks associated with the proposed Waste Treatment and Immobilization Plant (WTP) facility, the DOE regulatory approval process requires the Contractor to follow a process for identifying systems, structures and components (SSC) that are important-to-safety (ITS). One component of this process is to establish standards to limit the radiation dose to facility workers (workers), other Hanford Site workers (co-located workers), members of the general public (public), and the environment from the radiological consequences of normal operations and credible accident events. The original WTP Contractor (BNFL Inc.) specifically addressed radiological and nuclear safety standards in the regulatory submittal, *TWRS Privatization Radiological and Nuclear Exposure Standards for Facility and Co-Located Workers*,<sup>6</sup> and in Table 2-1 of Safety Criterion 2.0-1 of the SRD. A second component of this process is to ensure the collective risk from facility operations, including risk from multiple potential accidents, is limited. The Contractor's overall approach to safety integrates the radiation dose standards for normal operations and accident events, as low as reasonably achievable (ALARA) design objectives, risk criteria for operating the facility, limits on effluent releases, and mandatory defense in depth for SSCs.

There are distinct and important differences in the purpose and methods used to calculate doses for severity level determination, for conformance to the RES dose standards, and conformance to the risk goal acceptance criteria. Determination of the severity level for an accident is based on an unmitigated analysis using bounding assumptions for the purpose of establishing defense-in-depth requirements for ITS items. Conformance to the RES dose standards for an accident is based on a mitigated analysis using conservative assumptions for the purpose of demonstrating the adequacy of the ITS items selected. Conformance to the risk goal acceptance criteria for the collective set of all accidents is based on realistic analysis using best-estimate assumptions for the purpose of limiting the collective risk of normal operations and all potential accident events at the facility.

The RES dose standards are frequency based, which means there are different dose standards depending on the expected frequency of the event. The risk criteria relate either to the collective risk from normal operations and accidents or the collective risk from accidents alone. The dose standards and risk criteria work together to ensure adequate safety for the facility.

### 3.0 EVALUATION

#### 3.1 Proposed Change to the SRD: Facility Worker RES for Extremely Unlikely Events in SRD Table 2-1 of Safety Criterion 2.0-1 and Facility Worker Severity Level Definition for Extremely Unlikely Events in Section 4.3.1 of SRD Appendix A:

The proposed changes to the RES are an increase from  $\leq 25$  to  $\leq 100$  rem/event for the facility

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<sup>5</sup> RL/REG-97-13, *Regulatory Unit Position on Contractor-Initiated Changes to the Authorization Basis*, Rev. 9, dated September 2002.

<sup>6</sup> *TWRS Privatization Radiological and Nuclear Exposure Standards for Facility and Co-Located Workers*, BNFL-5193-RES-01, Rev. 0, BNFL Inc., dated August 28, 1997.

worker mitigated consequences in the extremely unlikely events probability range. The extremely unlikely events probability range is for events not expected to occur during the life of the facility, but postulated because their consequences would include the potential for the release of significant amounts of radioactive material. The estimated frequency of such occurrences is  $10^{-6}$  to  $10^{-4}$  per year ( $10^{-6} < f \leq 10^{-4}$ ).

The ABCN proposed changes to the definitions of SL-1 and SL-2 for facility worker and co-located worker unmitigated consequences. The definition of SL-1 for facility worker would change from "> 25 rem/event" to "> 100 rem/event." The definition of SL-2 for both facility and co-located worker would change from "5-25 rem/event" to "5-100 rem/event."

Evaluation (acceptable): The proposed change to the facility worker RES for extremely unlikely events is acceptable because it meets the two governing criteria. These criteria are conformance with specific risk goals that are part of the General Safety Objectives and consistency with the requirements of the U.S. Nuclear Regulatory Commission (NRC), as described in Sections 3.1.1 and 3.1.2 below.

The proposed change to the facility worker definitions of SL-1 and SL-2 as listed in Section 4.3.1 of SRD Appendix A is acceptable. The > 100 rem/event unmitigated value for determination of SL-1 events is consistent with control selection methods used elsewhere in the DOE complex including those used in the safety analysis of Hanford Tank Farms. Although differences in methodologies exist, the 100 rem value used in the determination of SL-1 events is generally consistent with the *Tank Farm Nuclear Safety Risk Ranking and Control Selection Guidelines*, Revision to 02-TED-003,<sup>7</sup> dated January 31, 2003, as issued by the ORP. Use of a value greater than 100 rem in the determination of SL-1 events would not be warranted; the 100 rem value is consistent with a level of radiation exposure that does not result in immediate fatality or serious injury. Although the severity level definitions are increased, preventive and mitigative controls are still required for SL-2 events between 25 rem/event and 100 rem/event to achieve conformance with the RES co-located worker value of 25 rem/event. The proposed change for facility worker unmitigated consequences in determination of the severity levels is consistent with the comparable NRC requirements, as described in Section 3.1.2 below. This approach provides for adequate safety.

### 3.1.1 Conformance with the General Safety Objectives:

RES must provide for conformance to the General Safety Objectives specified in DOE/RL-96-0006, which include the Accident Risk Goal and Worker Accident Risk Goal.

The Accident Risk Goal (DOE/RL-96-0006, Section 3.1.2) states: "The risk, to an average individual in the vicinity of the Contractor's facility, of prompt fatalities that might result from an accident should not exceed one-tenth of one percent (0.1%) of the sum of prompt fatality risks resulting from other accidents to which members of the U.S. population generally are exposed." A referenced footnote in DOE/RL-96-0006 states: "For evaluation purposes, individuals are assumed to be located within one mile of the controlled area." A proposed radiation dose

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<sup>7</sup> ORP letter from R. J. Schepens to E. S. Aromi, CHG, "Replacement of Guidance Provided by U.S. Department of Energy (DOE), Office of River Protection (ORP) Letter 02-TED-003," 02-TED-022, dated January 13, 2003.

standard for a facility worker of 100 rem for an extremely unlikely event ( $10^{-6}$  to  $10^{-4}$  per year) probability range conforms to the Accident Risk Goal because an acute radiation dose of approximately 100 rem carries almost no risk of prompt death.<sup>8</sup>

The Worker Accident Risk Goal (DOE/RL-96-0006, Section 3.1.3) states: “The risk, to workers in the vicinity of the Contractor’s facility, of fatality from radiological exposure that might result from an accident should not be a significant contributor to the overall occupational risk of fatality to workers.” A referenced footnote in DOE/RL-96-0006 states: “For evaluation purposes, workers are assumed to be located within the controlled area.” RL/REG-97-09, *Guidance for Review of TWRS Privatization Contractor Radiation Exposure Standards for Workers*,<sup>9</sup> states: “an overall risk of fatalities associated with facility accidents of  $1 \times 10^{-5}$  per year would result in an accident not being a significant contributor to the overall occupational risk of fatality to workers.<sup>10</sup> The  $1 \times 10^{-5}$  per year criterion is determined using the risk factor of  $1 \times 10^{-3}$  fatal cancers per rem recommended in the BEIR V report for exposures at or above 10 rem and adopted by both ICRP and NCRP.<sup>11</sup> RL/REG-97-09 also states for the extremely unlikely event ( $10^{-6}$  to  $10^{-4}$  per year) probability range, “Doses to both facility workers and co-located workers should not exceed 100 rem. Contractors will need to justify worker dose standards above 100 rem for credible (i.e., probability of  $1 \times 10^{-6}$  or greater) accidents.” A proposed radiation dose standard for a facility worker of 100 rem for an extremely unlikely event ( $10^{-6}$  to  $10^{-4}$  per year) probability range is justifiable with consideration of the Worker Accident Risk Goal provided the collective annual fatality risk from facility accidents meets the criterion of  $1 \times 10^{-5}$ . In other words, if there were multiple, independent accidents, each with associated risks approaching this value, it is likely the overall risk associated with the facility would be appreciably greater than  $1 \times 10^{-5}$ .

### 3.1.2 Consistency with NRC Requirements

This section on comparison with NRC requirements has been added for benchmark purposes, and not as requirements for the River Protection Project Waste Treatment Plant (RPP WTP). By identifying those NRC requirements, it provides DOE flexibility in the event future land use of the RPP WTP site should be opened to the public and the site regulated by the NRC. The NRC licenses non-reactor nuclear facilities under 10 CFR 70, *Domestic Licensing of Special Nuclear Material; Possession of a Critical Mass of Special Nuclear Material*. The rule requires a formal Integrated Safety Analysis that demonstrates conformance with the performance requirements established in Subpart H of the rule. The performance requirements limit the maximum likelihood of an accident sequence that results in a specific dose consequence (i.e., the risk levels

<sup>8</sup> *Method for the Assessment of Worker Safety under Radiological Accident Conditions at Department of Energy Nuclear Facilities*, EH-12-94-01, Vol. 2, *Appendixes*, Appendix B, 1994, p. B-1 (Draft Report).

<sup>9</sup> RL/REG-97-09, *Guidance for Review of TWRS Privatization Contractor Radiation Exposure Standards for Workers*, Rev. 0, 1997.

<sup>10</sup> Industry data is presented in EH-12-94-01, Volume 1, which states the risk of a fatality to workers in U.S. industries ranges from about  $0.3 \times 10^{-4}$  in the “safest” industry to  $4 \times 10^{-4}$  in the “least safe” industry. Based on the data, a value of  $1 \times 10^{-4}$  can be considered “average.” Using 10% as the threshold for a significant contributor as specified in the Worker Accident Risk Goal, an overall risk of fatalities associated with an accident of  $1 \times 10^{-5}$  per year would result in the accident not being a significant contributor to the overall occupational risk of fatality to a worker.

<sup>11</sup> *Health Effects of Exposure to Low Levels of Ionizing Radiation*, BEIR V, Committee on the Biological Effects of Ionizing Radiation, National Academy of Sciences, 1990.

consider the dose consequence criteria and govern the level of protection needed to prevent accidents that could exceed such criteria).<sup>12</sup> The effect of this approach is to limit the dose consequences within discrete likelihood ranges. Limiting a dose consequence level to a maximum likelihood addresses the objective of limiting the risk posed by the facility.

The rule defines two terms that are related to the severity or consequence of an event sequence.<sup>13</sup> These terms are high- and intermediate-consequence events; portions of the definitions most applicable to the radiological safety assessment are provided below:

- High-Consequence Events are those internally or externally initiated events that result in the following:
  - An acute worker dose of 1 Sv (100 rem) or greater total effective dose equivalent (TEDE);
  - An acute dose of 0.25 Sv (25 rem) or greater TEDE to any individual located outside the controlled area.<sup>14</sup>
- Intermediate-Consequence Events are those internally or externally initiated events that are not high-consequence events, which result in the following:
  - An acute worker dose of 0.25 Sv (25 rem) or greater TEDE;
  - An acute dose of 0.05 Sv (5 rem) or greater TEDE to any individual located outside the controlled area.

A proposed radiation dose standard for a facility worker of 100 rem in the extremely unlikely event ( $10^{-6}$  to  $10^{-4}$  per year) probability range is consistent with the 10 CFR 70.61 definition of high-consequence events.

### 3.2 Proposed Change to the Co-Located Worker RES for Extremely Unlikely Events:

The ABCN proposed an increase to the RES mitigated dose standard from  $\leq 25$  to  $\leq 100$  rem/event for the co-located worker in the extremely unlikely events probability range.

Evaluation (rejected): The proposed change to the co-located worker RES for extremely unlikely events is rejected because the Contractor was unable to provide a sufficient safety justification and examples of significant cost savings that would result from the change. If there were examples of cost savings attributable to the proposed co-located worker RES change and sufficient safety justification, additional considerations that would be evaluated include the nature of individuals composing the co-located worker population; the biological effects attributable to the proposed 100 rem standards; and consistency of the proposed standard with

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<sup>12</sup> 10 CFR 70.61, "Modification and Revocation of Licenses."

<sup>13</sup> Ibid 11.

<sup>14</sup> Per 10 CFR 20.1003, "controlled area" means any area, outside of a restricted area but inside the site boundary, access to which can be limited by the licensee for any reason.

the requirements of the NRC.

### 3.2.1 Cost Savings

The Contractor addressed whether the proposed changes result in cost savings in their ABCN. The Contractor stated “there are currently no examples of significant cost savings” that would result from the proposed change to the co-located worker RES. The Contractor has reinforced the proposed change to the co-located worker RES has no apparent cost savings in stating “[a]lthough changing the RES limit will not immediately result in significant cost savings, it would provide future flexibility in assessing the impacts of source term changes and design changes that could impact unmitigated consequences.” While such flexibility may be beneficial when evaluating accidents affecting facility workers, it does not appear warranted for accidents that are not confined to the facility and would affect co-located workers. Changing an RES value that has the potential to adversely affect the performance of the confinement systems in the facility does not appear warranted given that no apparent cost savings have been identified.

### 3.2.2 Co-located Worker Population

If the co-located worker RES were to result in a cost savings, it would be appropriate to consider the nature of the co-located worker population in determining the acceptability of the proposed change. A co-located worker can be an individual who has not received radiological worker training, and may have a condition that further restricts their exposure to radiation, such as pregnancy. Although neither condition would prohibit the acceptability of the proposed change, the justification for increasing the RES standard for these population groups would be needed to fully evaluate the acceptability of the proposed change.

### 3.2.3 Biological Effects

If the co-located worker RES were to result in a cost savings, it would be appropriate to consider the biological effects attributable to 100 rem exposure. The accepted value in industry for the onset of temporary blood chemistry changes in a healthy adult (i.e., co-located worker) is typically 25 rem. As a reference, *Introduction to Health Physics*, Page 256, states the following, “Changes in the blood count have been seen in individuals with whole-body gamma-ray doses as low as 140 mGy (14 rads). However, in most cases of overexposure, changes in the blood count are seen when the dose is in the range of 250 to 500 mGy (25 to 50 rads). Blood count changes are almost certain to appear when the dose is greater than 500 mGy.”<sup>15</sup> Both DOE and NRC regulations further restrict the potential for radiation exposure during normal operations to declared pregnant workers as a fetus is more radiosensitive than a healthy adult.

### 3.2.4 Consistency with NRC Requirements

If the co-located worker RES were to result in a cost savings, it would be appropriate to consider the consistency of the proposed standard with NRC regulations. The current regulatory and contractual requirements that govern the proposed facility and its operations do not necessitate that proposed safety criteria or standards be consistent with potential future regulation by the

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<sup>15</sup> *Introduction to Health Physics*, Herman Cember, Ph. D., Third Edition, McGraw-Hill, 1996.



NRC. However, consistency with NRC requirements is a consideration for the RPP WTP site because of the potential for the land being opened to the public and possible future NRC regulation of such land.

The proposed change to the RES for co-located workers from  $\leq 25$  rem/event to  $\leq 100$  rem/event for extremely unlikely events is not considered with NRC regulations for non-reactor nuclear facilities as regulated under 10 CFR Part 70. For example, a proposed radiation dose standard for a co-located worker of 100 rem in the extremely unlikely event ( $10^{-6}$  to  $10^{-4}$  per year) probability range is not consistent with the 10 CFR 70.61 definition of high-consequence events, which establishes a standard of 25 rem to any individual located outside the controlled area. One significant difference between NRC regulations and the WTP Contract requirements (Contract No. DE-AC27-01RV14136) is the Contract classifies individuals located outside the Contractor-leased property as co-located workers if they are located within the Hanford Site boundary. This classification is consistent with current practices and nomenclature used at Hanford and other DOE sites. NRC regulations do not include provisions for individuals to be classified as co-located workers. The NRC limits doses to individuals at the controlled area boundary<sup>16</sup> (considered “members of the public”) from accidents to less than or equal to 25 rem TEDE, based on 2-hour duration of exposure.

Title 10 CFR 100 establishes a guideline value of 25 rem for 2 hours at the exclusion area boundary. For the exclusion area, 10 CFR 100.3, “Definitions,” states the following:

“(a) *Exclusion area* means that area surrounding the reactor, in which the reactor licensee has the authority to determine all activities including exclusion or removal of personnel and property from the area. This area may be traversed by a highway, railroad, or waterway, provided these are not so close to the facility as to interfere with normal operations of the facility and provided appropriate and effective arrangements are made to control traffic on the highway, railroad, or waterway, in case of emergency, to protect the public health and safety. Residence within the exclusion area shall normally be prohibited. In any event, residents shall be subject to ready removal in case of necessity. Activities unrelated to operation of the reactor may be permitted in an exclusion area under appropriate limitations, provided that no significant hazards to the public health and safety will result.”

The co-located worker is defined by WTP as being “An individual within the Hanford Site, beyond the Contractor-controlled area, performing work for or in conjunction with DOE or utilizing other Hanford Site facilities.”<sup>17</sup> For evaluation of the WTP design to the exposure standards of DOE/RL-96-0006, Table 1, the location of the co-located worker is either at the controlled area boundary or beyond that boundary if such a location results in higher exposure. For a ground-level release, the location of the co-located worker is considered no closer than 100 m from the release point.

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<sup>16</sup> “Controlled area boundary” is defined in 10 CFR 72.106 to mean the area surrounding the facility over which the licensee exercises authority over its use.

<sup>17</sup> DOE/RL-96-0006, Section 6.0, “Glossary”, Revision 2, February 2001.

A co-located worker could be considered a “member of the public” under the NRC definitions and would thus be subject to a guideline value of 25 rem for 2 hours at the exclusion area boundary. Although differences exist in definitions and application of the accident dose limits, the WTP would not comply with NRC licensing requirements if the RES for co-located workers is changed to  $\leq 100$  rem/event.

### 3.3 Proposed Change to the Co-Located Worker Severity Level Definitions

The ABCN proposed a change to the definitions of SL-1 and SL-2 for co-located worker unmitigated consequences. The change to the definition of SL-1 for the co-located worker is from “ $> 25$  rem/event” to “ $> 100$  rem/event.” The change to the definition of SL-2 for the co-located worker is from “ $5 - 25$  rem/event” to “ $5 - 100$  rem/event.”

Evaluation (acceptable): The proposed change to the co-located worker SL definitions is approved. The  $> 100$  rem/event unmitigated value for determination of SL-1 events is consistent with control selection methods used elsewhere in the DOE complex including those used in the safety analysis of Hanford Tank Farms. Although differences in methodologies exist, the 100 rem value used in the determination of SL-1 events generally is consistent with the *Tank Farm Nuclear Safety Risk Ranking and Control Selection Guidelines*, Revision to 02-TED-003,<sup>18</sup> dated January 31, 2003, as issued by the ORP. Use of a value greater than 100 rem in the determination of SL-1 events would not be warranted; the 100 rem value is consistent with a level of radiation exposure that does not result in immediate fatality or serious injury. Although the severity level definitions are increased, preventive and mitigative controls are still required for SL-2 events between 25 rem/event and 100 rem/event to achieve conformance with the RES co-located worker value of 25 rem/event. This approach provides for adequate safety.

## 4.0 CONCLUSION

On the basis of the considerations described above, the ORP concluded there is reasonable assurance the health and safety of the public, the workers, and the environment will not be adversely affected by the approved proposed changes to the facility worker RES and severity level definitions, and the co-located worker severity level definitions in the extremely unlikely events probability range. These changes do not constitute a reduction in commitment or effectiveness relative to the conduct of operations and are approved. However, ORP does not approve the change to the RES for co-located workers.

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<sup>18</sup> Ibid 7.